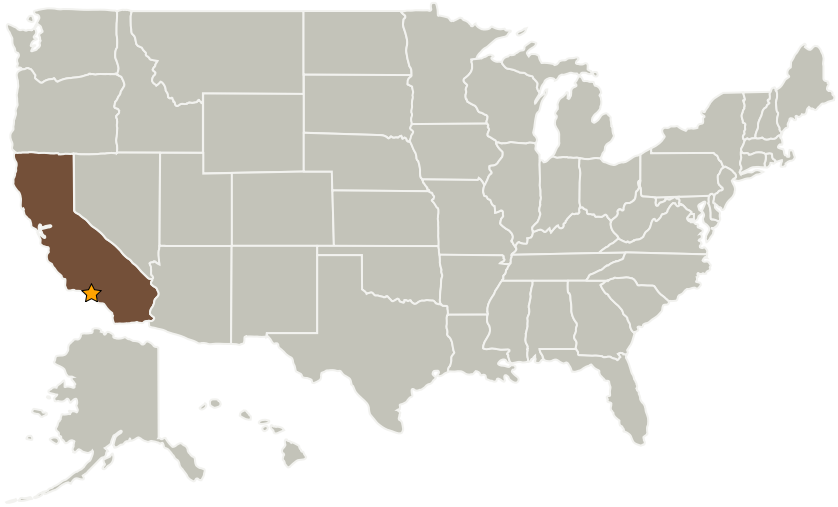
A Digital Correlation Spectrometer Chip with 1 GHz Bandwidth, 4096 Spectral Channels, and 4 W Power Consumption for Passive Microwave Remote Sensing Instruments, Phase II

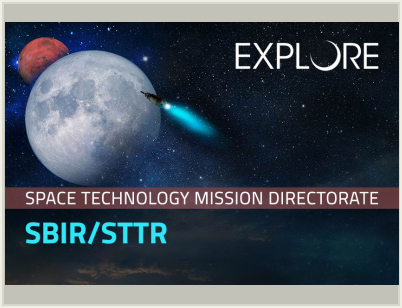
Completed Technology Project (2006 - 2008)

Project Introduction

The scope of this project is to provide a digital auto-correlation spectrometer fabricated on a single integrated circuit for NASA's future Earth-Sun System missions in order to enable the rapid development of small, ultra low-power, low-cost microwave remote sensing instruments for the analysis of chemical and physical properties of planetary atmospheres. The technical risk associated with the proposed Phase II project is low because all Phase I technical objectives were achieved using an innovative approach that consists of a synergistic combination of parallel architecture and differential circuits; based on the results obtained in Phase I, it is anticipated that the power consumption of a 4096-lag, 1 GHz bandwidth, 2-bit/4-level digital auto-correlation spectrometer chip fabricated with IBM's 90 nm will be less than 4 W. The overall benefits of the proposed project, if successful, consist of the availability of a new class of high-bandwidth and ultra-low power digital auto-correlation spectrometer chip that will facilitate the construction of NASA's spaceborne microwave remote sensing instruments with substantially lower life-cycle costs, power consumption, and mass relative to that of existing filter-bank and acousto-optical spectrometers.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Spaceborne, Inc.	Supporting Organization	Industry	La Canada, California

Primary U.S. Work Locations
California

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves